UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

OCT 10 2014

Ref: 8P-W-UIC

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Kirby Carroll, Environmental Manager
Newfield Production Company
1001 17th Street, Suite 2000
Denver, Colorado 80202

Re: Proposed Modification to Area UIC Permit UT22197-00000 Version 3, for the Portion of the Monument Butte Oil Field Located Within the Uintah and Ouray Indian Reservation, Uintah and Duchesne Counties, Utah

Dear Mr. Carroll:

Enclosed is a Statement of Basis describing proposed changes to numeric fracture gradient values in Part 24 of Underground Injection Control (UIC) Program Area Permit UT22197-00000 Version 3 and reasons for them. Also enclosed is a copy of the Public Notice Announcement. If the proposed modifications are issued final by the EPA, they would appear in a revised table in Part 24 of Final Area UIC Permit UT22197-00000 Version 4. No permit language would change as a result of this modification.

The U.S. Environmental Protection Agency regulations and procedures for issuing UIC Permit decisions are found in Title 40 of the Code of Federal Regulations Part 124 (40 CFR §124). These regulations and procedures require a Public Notice and the opportunity for the public to comment on this proposed UIC Permit decision.

The public comment period will run for at least thirty (30) days from the latest date of publication in the following newspapers:

The Vernal Express, Vernal
The Uinta Basin Standard, Roosevelt

The enclosed copy of the Public Notice Announcement and Proposed Modifications to Area UIC Permit UT22197-00000 V3 and Statement of Basis are being sent to afford you an opportunity to also comment on the Draft Modification decision during the comment period. These documents will be available on the Region 8 UIC webpage: http://www.epa.gov/region8/water/uic/.

A Final decision will not be made until after the close of the comment period. All relevant comments will be taken into consideration. If any substantial comments are received the Effective Date of the Final Permit will be delayed for an additional thirty (30) days, as required by 40 CFR §124.15(b), to allow for any potential appeal of the Final Permit decision.

If you have any questions or comments about the proposed modification, please contact Jason Deardorff at the letterhead address citing "Mail Code 8P-W-UIC." You may also telephone Jason Deardorff at (800) 227-8917, extension 312-6583.

Sincerely,

Douglas Minter
Chief, Underground Injection Control Unit
Office of Partnerships and Regulatory Assistance

Enclosures: Proposed Modification to Area UIC Permit UT22197-00000 V3 and Statement of Basis
Public Notice Announcement

cc: Letter Only:

Uintah & Ouray Business Committee:
Gordon Howell, Chairman
Ronald Wopsock, Vice-Chairman
Tony Small, Councilman
Phillip Chimburas, Councilman
Stewart Pike, Councilman
Bruce Ignacio, Jr., Councilman

Lelilah Duncan
Acting Superintendent
BIA - Uintah & Ouray Indian Agency

cc: All Enclosures:

Bart Powaukee
Environmental Director
Ute Indian Tribe

Ferron Sacakuku
Director of Land Management
Ute Indian Tribe

Manual Myore
Director of Energy, Minerals and Air
Ute Indian Tribe

Brad Hill
Utah Division of Oil, Gas, and Mining

Robin Hansen
Fluid Minerals Engineering Office
Bureau of Land Management, Vernal Field Office

Reed Durfey
District Manager
Newfield Production Company
Myton, Utah

PROPOSED MODIFICATION TO AREA UIC PERMIT UT22197-00000 V3 AND STATEMENT OF BASIS

Area UIC Permit UT22197-00000:
The Portion of Greater Monument Butte Oil Field Located within
The Uintah and Ouray Indian Reservation, Utah

NEWFIELD PRODUCTION COMPANY

Contact: Jason Deardorff
U.S. Environmental Protection Agency
Ground Water Program, 8P-W-UIC
1595 Wynkoop Street
Denver, Colorado 80202-1129
Telephone: 1-800-227-8917 ext. 312-6583

Summary of Administrative History for Area UIC Permit UT22197-00000:

Final Area UIC Permit UT22197-00000 and Statement of Basis	December 13, 2012
Final Area UIC Permit UT22197-00000 V2 and Statement of Basis	November 5, 2013
Final Area UIC Permit UT22197-00000 V3 and Statement of Basis	August 25, 2014
Final Area UIC Permit UT22197-00000 V4 and Statement of Basis	Pending/Proposed

This Statement of Basis gives the derivation of proposed modifications to Underground Injection Control (UIC) Permit UT22197-00000 Version 3 and the reasons for them. If the EPA approves the proposed modifications as final they would be included in Final Area UIC Permit UT22197-00000 Version 4 listed above.

General Information and Description of Permit

Permittee:
Newfield Production Company
1001 Seventeenth Street, Suite 2000
Denver, CO 80202

Facility:
Portion of the Monument Butte Field located within the
Uintah and Ouray Indian Reservation, Utah

On December 13, 2012, the EPA issued its final permit decision for Area UIC Permit UT22197-00000 to Newfield Production Company (Newfield) to construct and operate Class II-R (enhanced recovery) injection wells on the portion of the Greater Monument Butte Field located within the Uintah and Ouray Indian Reservation. The area covered by this permit is referred to as the Authorized Permit Area and is described in the Permit as: T8S, R17E; T8S, R18E; T8S, R19E; T9S, R17E Except Sections 31 - 36; T9S, R18E Except Sections 25, 26, 27 and Section 31 - 36; Sections 4, 5, 6, 7, 8, 9, N2 17 & N2 18 T9S, R19E S.L.B. & M., Uintah & Duchesne Counties, Utah, except that any well in this area for which the Endangered Species Act section 7(a)(2) or National Historic Preservation Act section 106 compliance process has not been completed by a federal agency is excluded from coverage under this permit. The EPA's 2012 decision authorized the continued operation of approximately 470 existing injection wells within the Authorized Permit Area and the continued conversion of oil-gas production wells to additional Class II-R (enhanced recovery) water injection wells. The Permit did not limit the number of Class II-R injection wells within the Authorized Permit Area, but is expected to regulate between 800 and 1,000 injection wells at full field development.

The Authorized Permit Area covers approximately 95 square miles and includes over 1,600 oil-gas wells of which 662 have been converted to or requested as injection wells regulated by the EPA as of October 7, 2014. Figure 1 shows the general location of the Greater Monument Butte Field and Figure 2 shows the Authorized Permit Area in relation to the State of Utah. Figure 3 shows the extent of development of the Monument Butte Field and the portion of the field covered by Area UIC Permit UT22197-00000. For information regarding the hydrogeologic and geologic settings, injection and confining zones,

USDWs, considerations under Federal law and cumulative effects to the environmental previously considered by the EPA, the reader is referred to the Final Statement of Basis for Area UIC Permit UT22197-00000 issued December 13, 2012. This Statement of Basis describes proposed modifications to Area UIC Permit Version 3 and reasons for them.

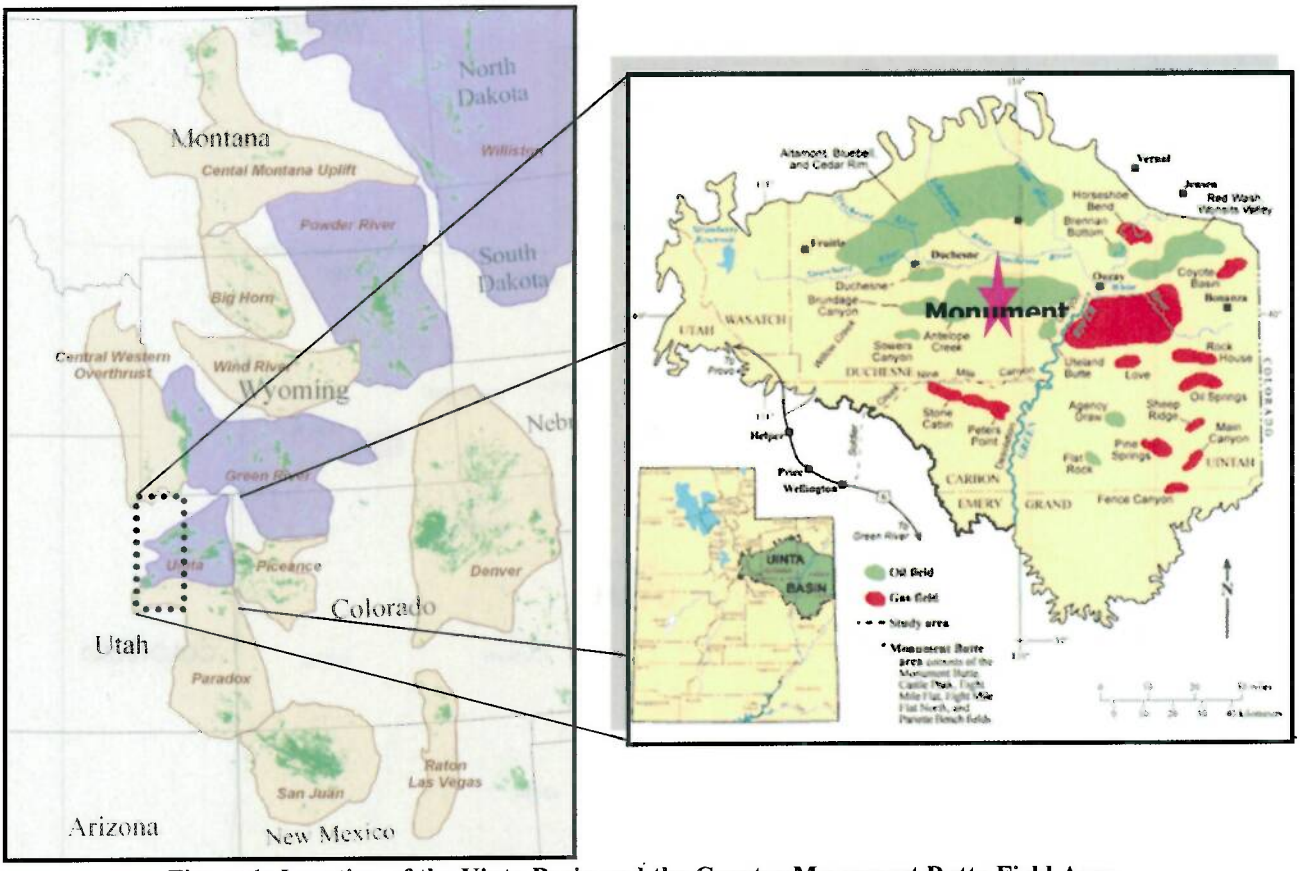

Figure 1: Location of the Uinta Basin and the Greater Monument Butte Field Area.

Figure 2: Location of the Authorized Permit Area within the State of Utah.

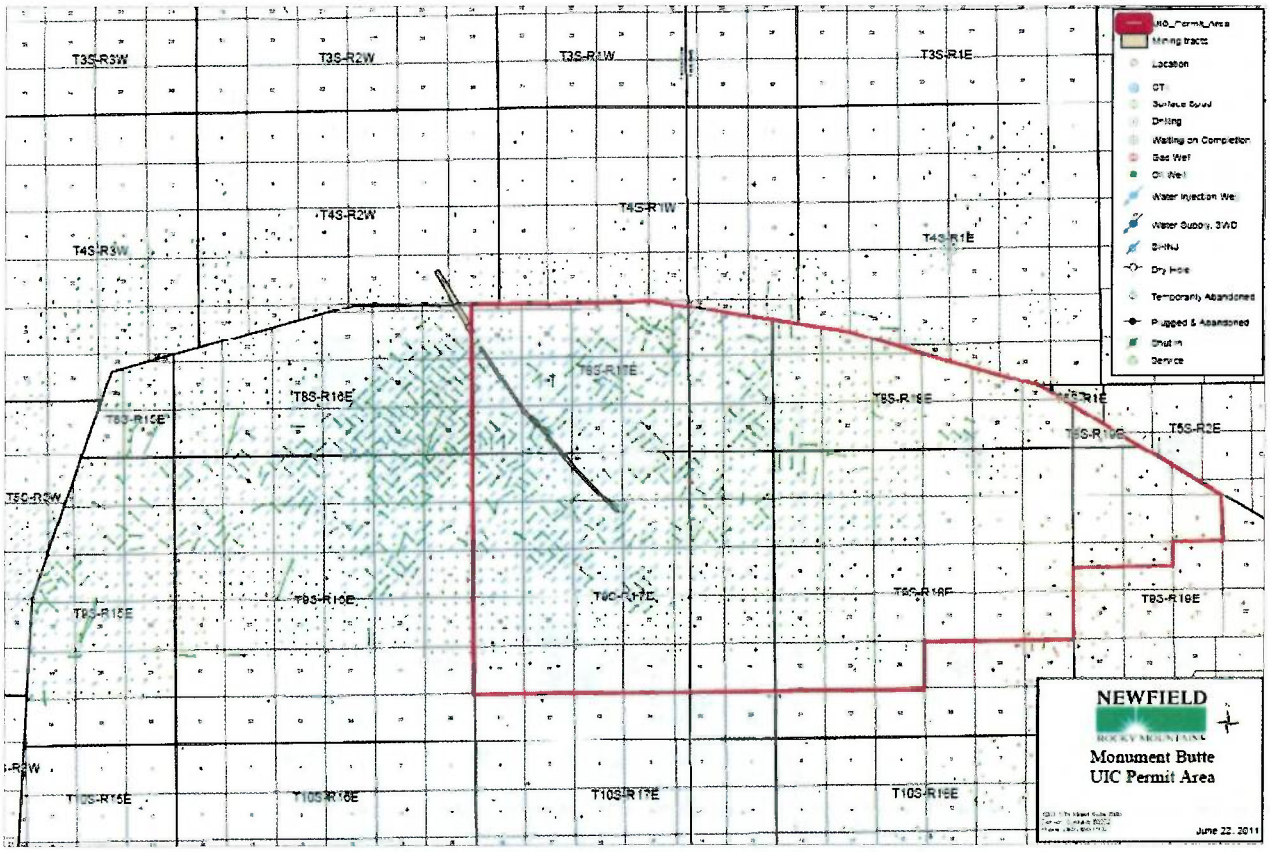

Figure 3: Map showing the state of development of the Monument Butte Field at the time of permit issue and the portion of the Monument Butte Field covered by Area UIC Permit UT22197-00000. The area outlined in red is the Authorized Permit Area for the portion of the field located within the Uintah and Ouray Indian Reservation.

Background Information Regarding the Proposed Modification

In Final Area UIC Permit UT22197-00000 Version 2, the EPA replaced 97 EPA Reference Sections in Part 24 of the Permit with 65 Fracture Gradient Areas that more accurately reflected the distribution of EPA fracture gradient data within the permit area. Previously, fracture gradient data within 97 EPA-designated Reference Sections were averaged for each section and this average was used to calculate the Maximum Allowable Injection Pressure (MAIP) of each injection well located within that Reference Section. The Permittee expressed concern that this methodology, where the geographic sections of interest are administratively selected instead of data defined, did not take into account variations in geology, pore pressure, and overburden stresses that naturally occur in the field. Additionally, simple averaging of a limited number of data points meant some resulting fracture gradients were overly sensitive to outliers, or unusually high or low data points compared to other data within a Reference Section. The Permittee proposed to overcome the limitations of simple averaging of fracture gradients across administratively selected areas by using an interpolated grid technique that weights each fracture gradient data point based on its location, magnitude and proximity to other permit area locations of known fracture gradients.

The interpolated grid methodology is summarized as follows: First, all available fracture gradient data are assigned to their well locations across a two dimensional grid domain (map) of the permit area. Next, fracture gradient values for grid locations away from these known data points are estimated as a function of each location's distance from the nearest known data point. Grid areas with similar facture gradients are then delineated into separate Fracture Gradient Areas. Finally, the simple average of known fracture gradient values from each Fracture Gradient Area is calculated. Figure 4 shows an example of how this technique was used to establish fracture gradient areas for a geographic area with four known data points.

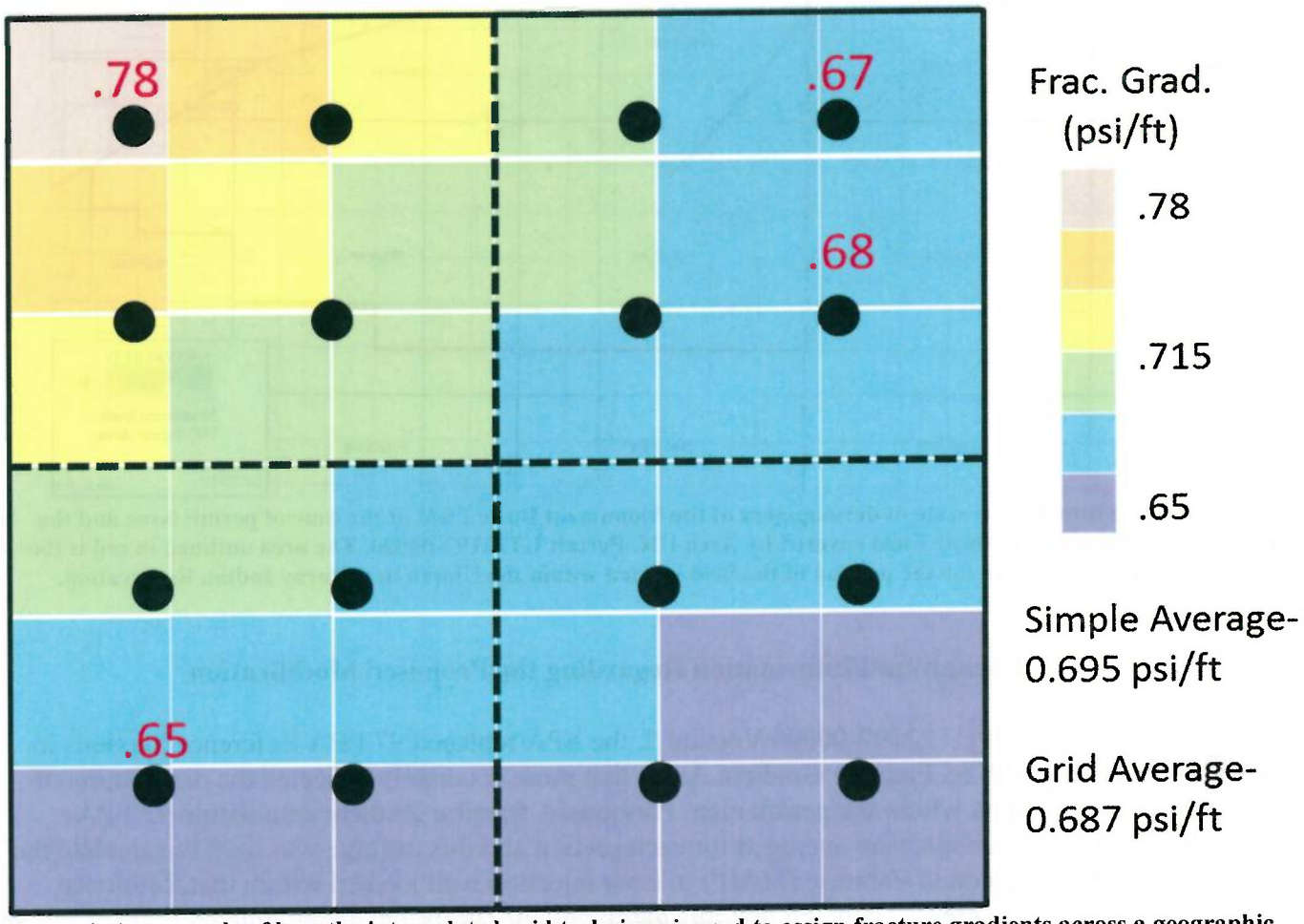

Figure 4: An example of how the interpolated grid technique is used to assign fracture gradients across a geographic area with four known data points.

This technique has several advantages over using fracture gradients averaged from the EPA's 97 Reference Sections. First, sampling from the interpolated grid appropriately weights each data point geographically, ensuring that closely spaced known data points will have a diminished effect on the resulting average and that geographically isolated data points will be appropriately considered. Second, this approach reduces the impact of data outliers and therefore reduces the risk of skewing the MAIP of injection wells within a Fracture Gradient Area based on a single outlying fracture gradient value. Because the data is distance weighted, natural variability that occurs due to geologic factors are taken into account which also has the effect of reducing pressure differentials across Fracture Gradient Area

boundaries. For example, the risk of having two proximately located injection wells injecting at vastly different pressures because they are located on either side of an administratively selected boundary is reduced because the new, data-defined Fracture Gradient Area boundaries more accurately reflect the transition of pressure and geologic variation across the field. As a result, fracture gradients determined utilizing the interpolated grid methodology decrease the risk of the calculated MAIP of an injection well resulting in the propagation of fractures while at the same time ensuring more consistent injection pressures across the field for the Permittee.

The 65 Fracture Gradient Areas are part of the Permittee's reservoir pressure management plan and enable the reservoir pressure to be maintained in highly developed parts of the field while gradually increasing the reservoir pressure in parts of the field that are less developed or less pressured than is ideal for enhanced oil recovery. The EPA expects that over time, as lower pressured areas equilibrate with higher pressured areas, the number of Fracture Gradient Areas necessary to establish and maintain pressure equilibrium in the field will decrease as larger portions of the field exhibit similar fracture gradient values during step rate testing. When this occurs, the EPA or the Permittee may initiate a permit modification process following protocols at 40 CFR §144.39 to modify the number of Fracture Gradient Areas in Part 24 of the permit.

As discussed in the Statement of Basis for Final Area UIC Permit UT22197-00000 issued December 13, 2012, the EPA anticipated future permit modifications to Part 24 to increase or decrease the fracture gradients used for Fracture Gradient Areas and stated this would be handled according to requirements at 40 CFR §144.39. The EPA stated that such modification would be based on the Permittee's request and submission of updated step rate test data to replace existing data points in the EPA's data set or new step rate tests conducted on more recently constructed injection wells that would supplement existing EPA data.

Proposed Modification to Area UIC Permit UT22197-00000 Version 3

On September 22, 2014, the Permittee requested that Part 24 of Area UIC Permit UT22197-00000 V3 be updated to reflect recently obtained step rate test data from Monument Butte Field injection wells within the EPA's permit area. The Permittee included with this request data from 25 recent step rate tests conducted on EPA-regulated injection wells. The EPA subsequently conducted its own analysis of each submitted test. Where the EPA's analysis agreed with the Permittee's analysis, the fracture gradient for that well in the EPA's data set was either updated with a revised fracture gradient or added anew if that well was not previously included in the data set. Where the EPA calculated a slightly higher or lower fracture gradient than the Permittee using the same data, the EPA approved whichever fracture gradient was lower, or more conservative from a USDW protection standpoint. The EPA then recalculated averages for each Fracture Gradient Area to determine necessary updates to the table in Part 24. In addition to these updates to fracture gradients, the EPA is utilizing this Modification No. 3 to correct several typos in the table that resulted in the bottom row of sections in the EPA's geographic permit area not being included in any Fracture Gradient Area in the table. To correct this typo, and to incorporate recently obtained step rate test data, the EPA is proposing to modify the table in Part 24 as follows:

Table 1: Proposed changes to the table in Part 24 of the Permit.

Fracture Gradient Area Number	Geographic Description (Proposed changes in green)	Current Fracture Gradient	Proposed Fracture Gradient
1	Sections 6, 7, 8, 17, 18 and the NW, SW and SE quarters of section 5, T9S-R17E	0.869	0.870
2	E2 of section 23, T8S-R17E	0.608	0.737
12	Section 34, T8S-R17E	0.714	0.732
13	Section 35, T8S-R17E	0.740	0.796
15	E2 of section 36, T8S-R17E	0.700	0.727
16	N2 of Section 31, T8S-R18E	0.694	0.741
20	Section 5, T9S-R18E	0.750	0.760
21	Section 33, T8S-R18E	0.677	0.736
32	Section 7, T9S-R18E	0.655	0.729
33	Section 9, T9S-R18E	0.690	0.739
34	Section 18, T9S-R18E	0.682	0.700
37	Sections 19 and 30 of T8S-R18E	0.681	0.698
40	Sections 21 and 28 of T9S-R17E	0.856	no change
41	Sections 22 and 27 of T9S-R17E	0.773	no change
42	Sections 19 and 30 of T9S-R17E	0.655	0.708
43	Sections 20 and 29 of T9S-R17E	0.655	0.723
44	Section 29 of T8S-18E	0.772	0.738
47	E2 of section 24, E2, E2E2W2, and E2W2E2W2 of section 25, T8S-R17E.	0.705	0.719
49	W2W2 and E2W2W2W2 of section 25, T8S-R17E	0.730	0.751
50	Sections 20, 21, and 28 of T8S-R18E	0.655	0.695
53	Sections 23, 24, 25 and 26 of T9S-R17E	0.655	no change
54	Sections 19, 20, 29 and 30 of T9S-R18E	0.655	no change
55	Sections 21, 22 and 28 of T9S-R18E	0.655	no change

For additional information about these proposed revisions to Part 24 of Area UIC Permit UT22197-00000 Version 3, including maps of the permit area, the step rate test data or methodology used, please contact Jason Deardorff by email at deardorff.jason@epa.gov or phone at 303-312-6583.

U.S. ENVIRONMENTAL PROTECTION AGENCY
ANNOUNCEMENT OF PUBLIC NOTICE
OF GROUND WATER PERMIT ACTION

The U.S. Environmental Protection Agency (EPA) intends to issue an Underground Injection Control (UIC) permit-related action, under the authority of the Safe Drinking Water Act and UIC program regulations, for wells operated by Newfield Production Company under EPA Area UIC Permit UT22197-00000 Version 3, issued final on August 25, 2014. This action would update numeric fracture gradient values in a table within the Permit and would result in maximum allowable injection pressures for enhanced oil recovery injection wells increasing and decreasing. The public notice, which requests comments on this action within 30 days, can be found at the EPA Region 8 UIC program's website: http://www.epa.gov/region8/water/uic/. Alternatively, the public may contact or call Jason Deardorff at deardorff.jason@epa.gov, 800-227-8917 extension 312-6583 or 303-312-6583 for additional information and to obtain a copy of the public notice and documentation associated with this action.

UIC Class II Draft Area UIC Permit UT22197-00000 Modification No. 3 - Newfield Production Company - Denver, Colorado

The EPA Region 8 UIC Program is soliciting public comment on the proposed issuance of a major permit modification to Area UIC Permit UT22197-00000 issued to Newfield Production Company (Newfield) on December 13, 2012 and last modified on August 25, 2014, as Version 3 of the Permit. This currently active permit authorizes ongoing construction and operation of Class II-R (enhanced recovery) water injection wells within a portion of the Monument Butte Oil Field in the Uinta Basin of eastern Utah. At present, Newfield operates 662 Class II-R injection wells within the permit area and currently converts oil production wells to water injection wells at an approximate rate of 115 wells per year. The proposed action would modify numeric values for fracture gradients the geographic scope of seven of 65 fracture gradient areas in the table found in Part 24 of the Permit and would result in the maximum allowable injection pressures for some injection wells increasing or decreasing, depending on the well's location. If approved, the changes would appear as updates in to the table in Part 24 of Final Area UIC Permit UT22197-00000 Version 4. No Permit language will be changed as part of this action and the EPA is only soliciting comments regarding proposed changes to the table in Part 24 and resulting changes in maximum allowable injection pressures.